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882835 (08) 5930179 July 27, 1999

#### UNITED STATES PATENT AND TRADEMARK OFFICE GRANTED PATENT

5930179

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July 27, 1999

#### Program .circuit

**REISSUE:** July 25, 2001 - Reissue Application filed Ex. Gp.: 2818; Re. S.N. 09/915,906 (O.G. June 25, 2002)

INVENTOR: Cha, Byoung Kwon - Ichon-Shi, Korea, South (KR)

**APPL-NO:** 882835 (08)

FILED-DATE: June 26, 1997

**GRANTED-DATE:** July 27, 1999

**PRIORITY:** June 29, 1996 - 9625547, Korea, South (KR)

**ASSIGNEE-PRE-ISSUE:** June 26, 1997 - ASSIGNMENT OF ASSIGNORS INTEREST (SEE DOCUMENT FOR DETAILS)., HYUNDAI ELECTRONCIS INDUSTRIES CO., LTD. SAN 136-1, AMI-RI, BUBAL-UEP, ICHON-SHIKYUNGKI-DO, (1), Reel and Frame Number: 008662/0411

**ASSIGNEE-AT-ISSUE:** Hyundai Electronics Industries, Co., Ltd., Kyungki, Korea, South (KR), Foreign company or corporation (03)

LEGAL-REP: Harris, Scott C.

PUB-TYPE: July 27, 1999 - Utility Patent having no previously published pre-grant publication (A)

**PUB-COUNTRY:** United States (US)

**US-MAIN-CL:** 365#189.07

**US-ADDL-CL:** 365#185.22

**CL:** 365

**SEARCH-FLD:** 365#189.07, 365#201, 365#185.22

IPC-MAIN-CL: [6] G11C 007#00

PRIM-EXMR: Nguyen; Tan T.

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1/1 FAMPAT - @QUESTEL-ORBIT - image FAN 20063140122989 PN GB9712951 D0 19970820 [GB9712951] STG: Application for patent AP: 1997GB-0012951 19970619 丙 GB2314953 A 19980114 [GB2314953] STG: Application published **園 US5930179 A/19990727 [US5930179]** STG: United States patent AP: 1997US-0882835 19970626 GB2314953 B 20000705 [GB2314953] STG: Patent granted TI Program circuit HYUNDAI ELECTRONICS IND PA Hyundai Electronics Industries, Company, Ltd., Kyungki [KR] PAO IN CHA BYOUNG KWON 1996KR-0025547 19960629 PR IC G11C-007/00 G11C-016/06 G11C-016/10 G11C-016/34 G11C-016/10 [2006-01 A - I R M EP]; G11C-016/34 [2006-01 A - I R M EP] ICAA -ICCA -G11C-016/06 [2006 C - I R M EP] EC G11C-016/10 G11C-016/34V6 ORIGINAL (O): 365189070; CROSS-REFERENCE (X): 365185220 **PCL** (US5930179) CTUS4811294; US5299162; US5629890 (GB9712951) CT Cited in the search report GB2308701(A);US5566113(A) (US5930179) AB The program circuit according to the present invention can apply a program voltage to the only memory cells which are not programmed during a re-programming operation, thus, the present invention can be prevent a lowering of reliability of the memory cell due to a continued supply of a program bias voltage. **OBJ** The present invention relates to a program circuit and, more particularly, to a program circuit which can prevent a lowering of reliability occurring during the process of verifying the programmed data. It is therefore an object of the present invention to provide a program circuit which can apply a program bias voltage only to the memory cell which is not programmed during a reprogramming operation. ICLM -(US5930179) 1. A program circuit comprising: a comparator for comparing output data of a data input buffer with output data of a sense

amplifier bit by bit, and for outputting a re-program operation signal if the data are different

from each other;

•a data latch circuit for latching the comparing results of the output data of said data input buffer and the output data of said sense amplifier; a control circuit for generating a high voltage for receiving the output data of said data input buffer and the data latched at said data latch circuit, respectively, and for outputting a signal for applying a program bias voltage to a memory cell which has not been completely programmed in response to a power-up reset signal and program state signal.

**UP** - 2000-08

1/1 LGST - ©EPO

PN - 🖪 US5930179 A 19990727 [US5930179]

**AP** - US88283597 19970626 [1997US-0882835]

**ACT** - 20020625 US/RF-A

REISSUE APPLICATION FILED

**EFFECTIVE DATE: 20010725** 

**UP** - 2003-22

#### 1/1 CRXX - ©CLAIMS/RRX

**AN** - 3176934

PN - 🔁 5,930,179 A 19990727 [US5930179]

PA - Hyundai Electronics Industries Co Ltd KR

PT - E (Electrical)

ACT - 20010725 REISSUE REQUESTED

ISSUE DATE OF O.G.: 20020625

REISSUE REQUEST NUMBER: 09/915906

**EXAMINATION GROUP RESPONSIBLE FOR REISSUEPROCESS: 2818** 

#### Reissue Patent Number:

**UP** - 2002-26

**UACT** - 2002-06-25

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### Extended Family Search Results

5930179/PN Results: 2

#### **PATENT FAMILY**

#	Patent No.	Kind	Date	Applic.No.	Date
<u>1)</u>	GB9712951	D0	19970820	1997GB-0012951	19970619
	GB2314953	Α	19980114		
	GB2314953	В	20000705		
<u>2)</u>	US5930179	Α	19990727	1997US-0882835	19970626

**Priority:** 

1996KR-0025547 19960629

1.1.1.2 PLUSPAT - ©QUESTEL-ORBIT

PN - GB9712951 D0 19970820 [GB9712951]

STG - (D0) Application for patent

TI - (D0) Program circuit

PA - (D0) HYUNDAI ELECTRONICS IND

IN - (A) CHA BYOUNG KWON

IC - (A) G11C-016/06

PN2 - 🖾 GB2314953 A 19980114 [GB2314953]

STG2 - (A) Application published

TI2 - (A) Program circuit for verifying the program data in a flash memory device

PA2 - (A) HYUNDAI ELECTRONICS IND (KR)

IN2 - (A) CHA BYOUNG KWON

**IC2** - (A) G11C-016/06

PN3 - GB2314953 B 20000705 [GB2314953]

STG3 - (B) Patent granted
TI3 - (B) Program circuit

PA3 - (B) HYUNDAI ELECTRONICS IND (KR)

IN3 - (B) CHA BYOUNG KWON (KR)

**IC3** - (B) G11C-016/34

**AP** - GB9712951 19970619 [1997GB-0012951]

PR - KR19960025547 19960629 [1996KR-0025547]

ICAA - G11C-016/10 [2006-01 A - I R M EP]; G11C-016/34 [2006-01 A - I R M EP]

ICCA - G11C-016/06 [2006 C - I R M EP]

**EC** - G11C-016/10

G11C-016/34V6

DT - Basic

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2/2 PLUSPAT - @QUESTEL-ORBIT - image

🔁 US5930179 A 19990727 [US5930179]

(A) United States patent STG TI (A) Program circuit

(A) HYUNDAI ELECTRONICS IND (KR) PA

Hyundai Electronics Industries, Company, Ltd., Kyungki [KR] PA<sub>0</sub>

(A) CHA BYOUNG KWON (KR) IN

(A) G11C-007/00 IC

AP US88283597 19970626 [1997US-0882835] PR KR19960025547 19960629 [1996KR-0025547]

ICAA -G11C-016/10 [2006-01 A - I R M EP]; G11C-016/34 [2006-01 A - I R M EP]

G11C-016/06 [2006 C - I R M EP] ICCA -

G11C-016/10 EC G11C-016/34V6

ORIGINAL (O): 365189070; CROSS-REFERENCE (X): 365185220 **PCL** 

DT Corresponding document

#### 1/1 LEGALI - ©EPO

US5930179 A 19990727 [US5930179] PN

US88283597 19970626 [1997US-0882835] AP

ACT 20020625 US/RF-A

REISSUE APPLICATION FILED

**EFFECTIVE DATE: 20010725** 

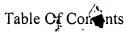
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TITLE 5. GOVERNMENT ORGANIZATION AND EMPLOYEES	
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⊕ ☐ TITLE 8. ALIENS AND NATIONALITY	
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TITLE 26. INTERNAL REVENUE CODE	
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- **⊕** ☐ TITLE 48. TERRITORIES AND INSULAR POSSESSIONS
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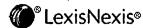
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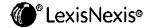
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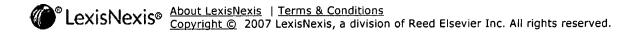
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